

## APPENDIX A: CASE STUDY

### HAZARDVILLE INFORMATION COMPANY (HIC)

#### INTRODUCTION

The Hazardville Information Company (HIC) is a state-of-the art information technology (IT) services company located in a major metropolitan city in a typical suburban business office park. The company's mission is to provide information technology and services support to include hosting servers, databases, applications, and other hardware and software; develop, install, and maintain software applications; provide field support IT technicians; and provide 24-hour help desk support.



**Figure 1. Hazardville Information Company (HIC)**

The Hazardville Information Company has over 20 clients and supports approximately 1,000 users and 100 applications as a primary data center and as a disaster recovery backup site. HIC clients include local and regional government offices and commercial entities. Many clients depend on HIC's ability to provide real time IT support, on a 24 x 7 basis. Others rely on the company's IT backup services. Major clients and support contracts include:

- Fortune 500 companies
- National and regional banks and credit unions
- A major airline
- Large prime defense contractors
- Government agencies, including one classified client

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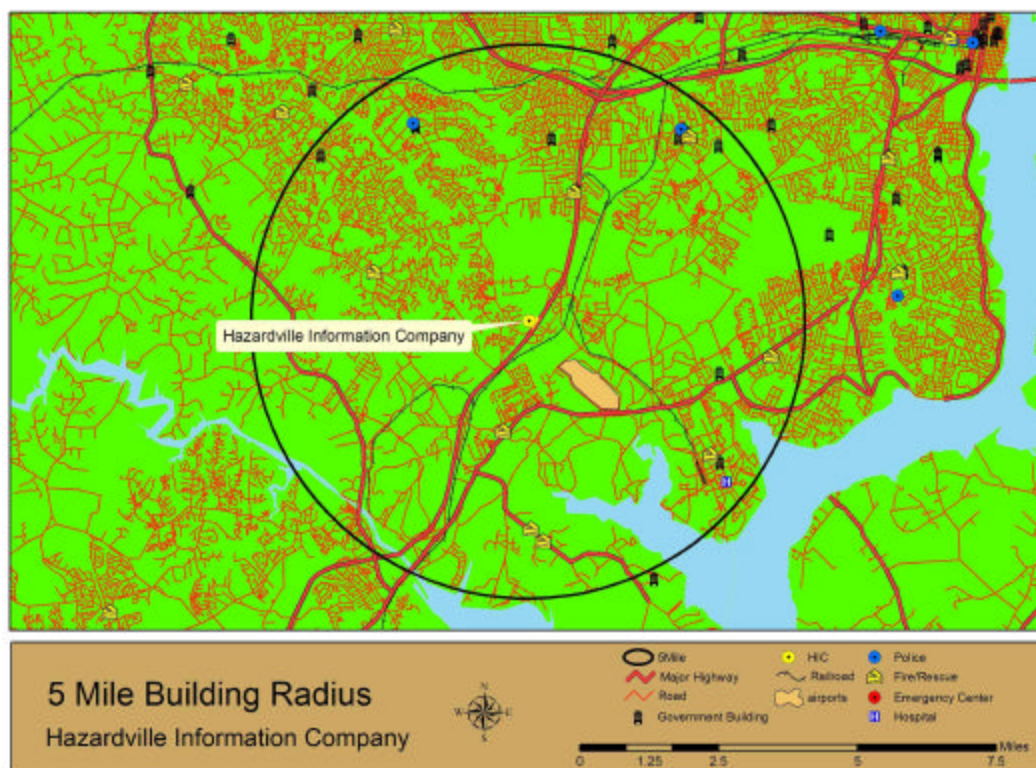
HIC is certified to provide IT support and storage to government clients at Top Secret levels, using dedicated classified equipment and networks. HIC's technology ranges from leading edge mainframe and desktop computers and optical mass storage devices to wired and wireless networks. HIC has over 130 employees and approximately 80 to 100 employees are in the building at any given time.

The Hazardville Information Company has a number of key staff that support the various projects. The president, chief executive officer, security officer, and several division managers possess high level government security clearances. Approximately half of the technical staff hold mid-level government security clearances. All company employees sign confidentiality agreements for the commercial clients and have access to a number of company's proprietary data. The IT division manager and his staff of database administrators have full administrative privileges on all systems. The company has a robust recall system and staff notification process in the event of an emergency and/or surge support requirement.

The HIC building is strategically located near many of HIC's clients and management does not want to move from the facility or location.

**GENERAL SITE DATA**

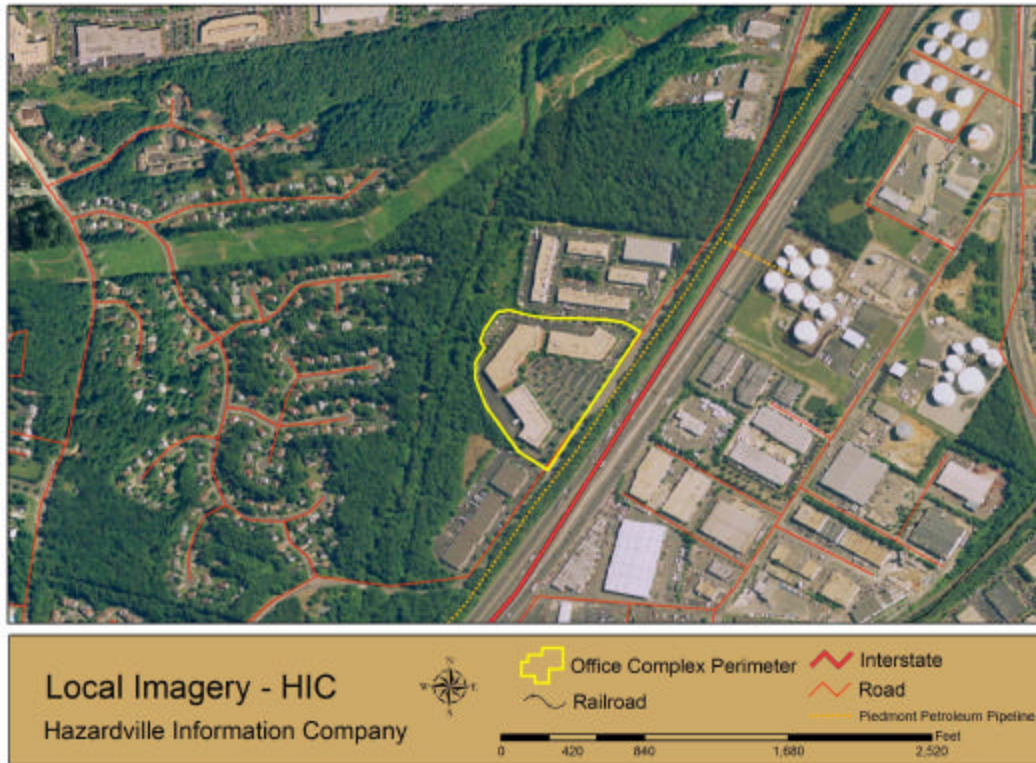
The Hazardville Information Company is located approximately 15 miles outside of a major urban city in the suburbs, and adjacent to a major interstate highway. There are several commercial iconic properties, one military installation, and several government offices within a 5-mile radius of the HIC building.



**Figure 2. HIC Corporate Business Park 5-Mile Radius**

The office building is part of a corporate business park. HIC does not control the front parking area, signage, or other general site conditions such as stormwater drainage, lighting, or vehicle and pedestrian traffic flow and movement. Front parking spots are approximately 44 feet from the main HIC lobby entrance. The business park is responsible for grounds maintenance, including cutting the grass, planting flowers, trimming trees, sweeping the parking lot, and towing unauthorized vehicles. Trash service is the responsibility of tenants. HIC has a large dumpster located at the rear of the loading dock area approximately 50 feet from the building. HIC receives the mail and packages at the front office lobby desk. Large packages and equipment are delivered to the rear loading dock. HIC does not have a separate mail room, but does have an internal administrative space with copiers, printers, supplies, and staff mailboxes. The front desk receptionist is responsible for sorting and screening all mail.

The business park is adjacent to a major interstate highway and there are a number of storage tanks, manufacturing and production facilities, and other commercial properties across the interstate.



**Figure 3. HIC Business Park Perimeter and Surrounding Buildings**

The HIC office space has client and staff parking in the front and a rear parking and loading dock area for supply trucks, vendors, and trash.

The front parking area is unrestricted, but the back parking area is fully enclosed with chain link fencing on the perimeter of the property. There is no gate or means to prevent vehicles from transiting around the rear of the business park.





**Figure 4. HIC Office Location**

There are a significant number of hazardous waste sites in near proximity to the HIC building. The vast majority are small generators such as gas stations, dry cleaning, and other commercial businesses. Large generators include the petroleum storage and production facility located across the interstate.

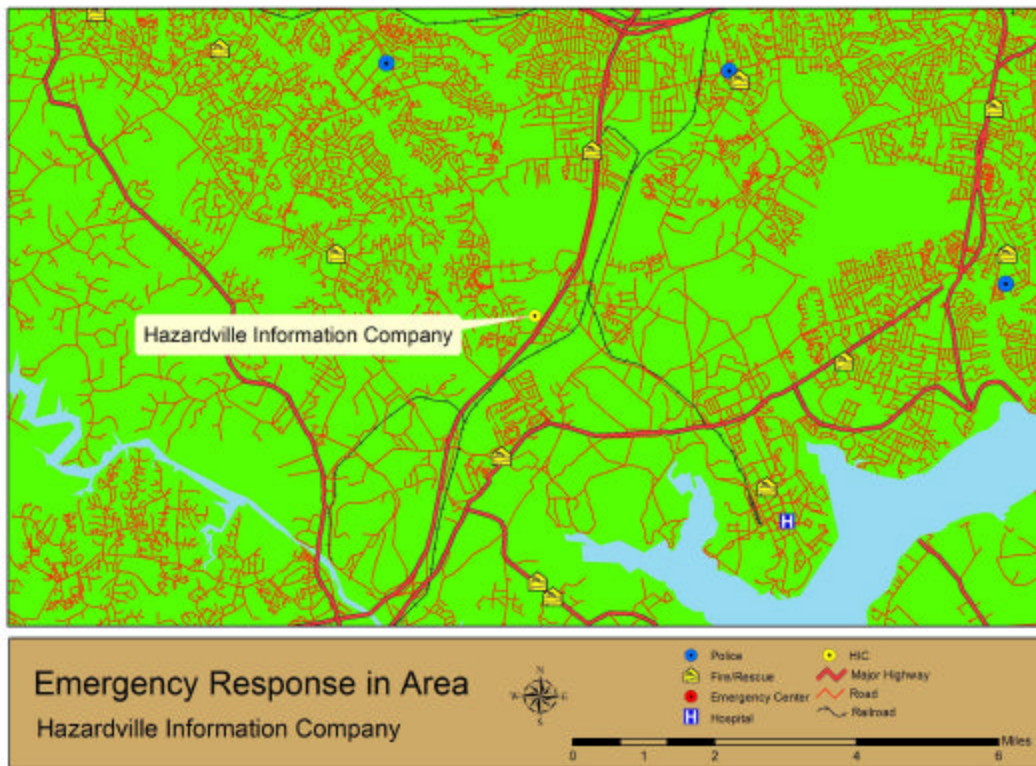
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**Figure 5. HAZMAT Sites Near the HIC Building**

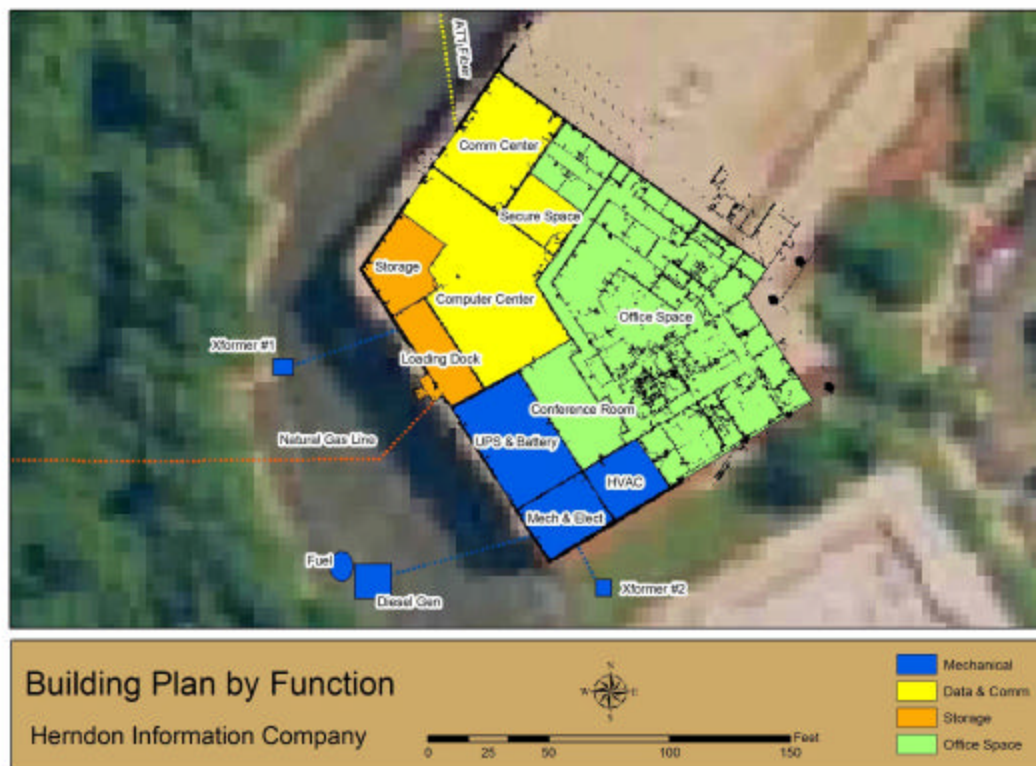
The prevailing weather pattern in the summer and fall is from the south Atlantic and the Gulf of Mexico. Warm, moist air brings thunderstorms and higher humidity. In the fall, cooler air from the north and west returns. Winter weather blasts across the state from the northern or central part of the continent. With no other weather activity, the prevailing wind is normally from the west-northwest.

The local emergency response capabilities include primary police, fire, and medical facilities approximately 8 to 10 miles away. There are multiple means of ingress and egress to the HIC building complex and the site is served by fire mains with a hydrant located approximately 200 feet from the HIC office.



**Figure 6. Emergency Response Capability Near the HIC Building**

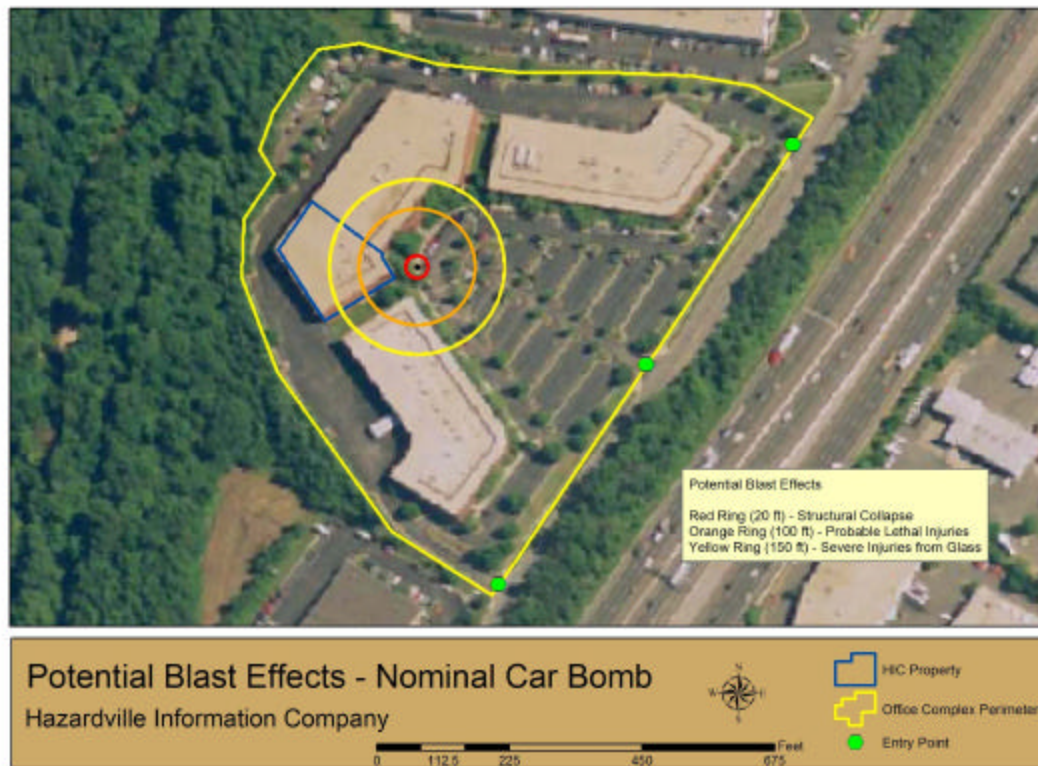




**Figure 7. HIC Functions and Building Layout**

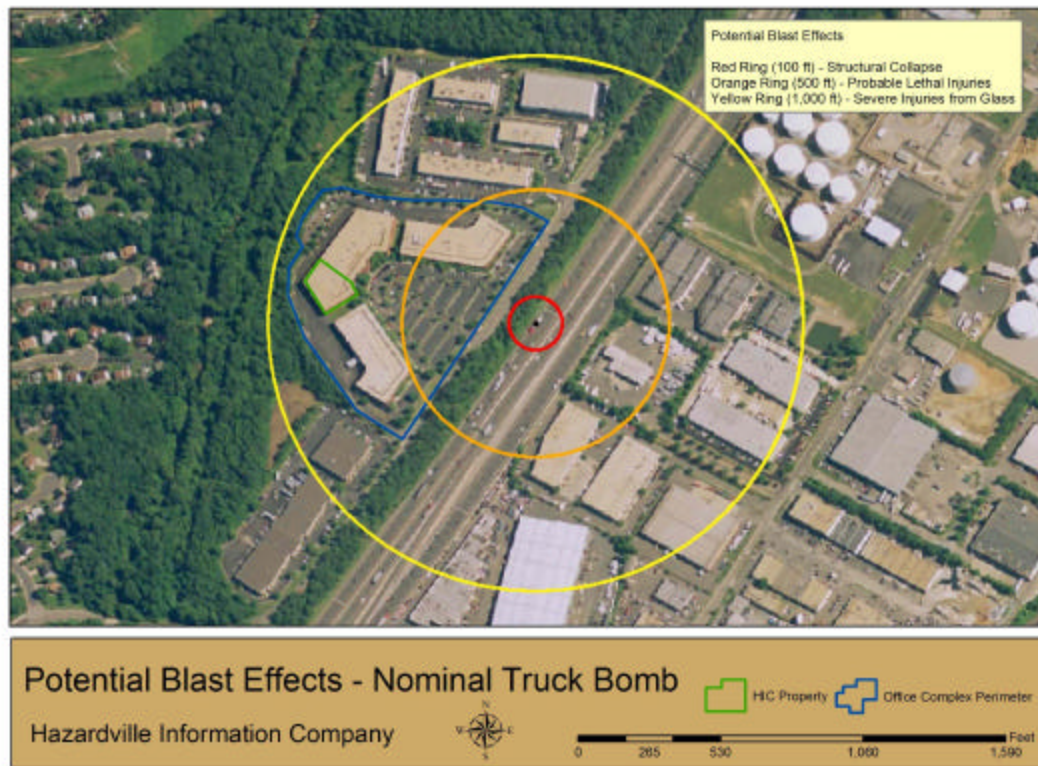
The nominal range to effects chart radius of influence of a small car bomb detonation at the front entrance indicates that the building would experience significant damage, but likely not suffer progressive collapse. The front façade of the building is approximately 75 percent annealed glass and has an 8-foot overhang. The terrain slopes upward from the parking lot to the main entrance, and is landscaped with flower beds and trees. Key staff would probably be killed and administrative functions destroyed, but the Computer Center and Communications functions would likely survive relatively intact.





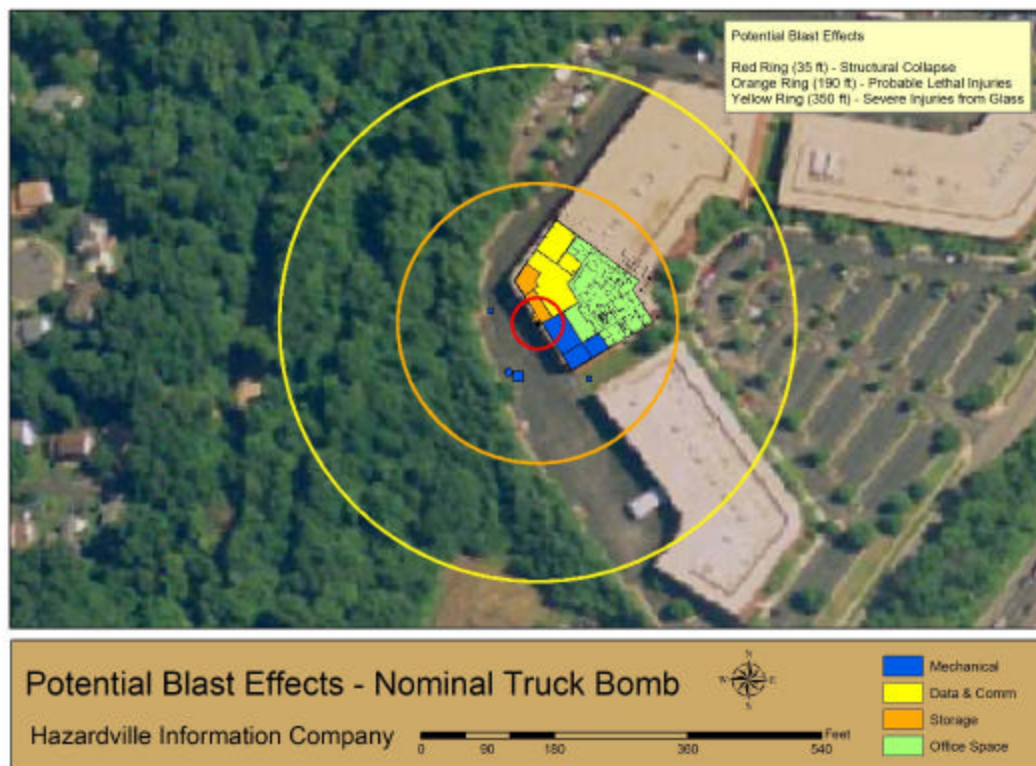
**Figure 8. Car Bomb Blast Effects (Front Entrance Parking)**

A truck bomb detonation on the interstate would also significantly damage the HIC building, primarily glass breakage and potentially some structural damage. If the truck bomb were to detonate near the tank farm, the ensuing explosion, fire, and plume would have significant impact on the HIC building.



**Figure 9. Truck Bomb Blast Effects (Interstate Highway)**

A truck bomb detonation at the rear of the HIC building at the loading dock would result in significant structural damage and potentially progressive collapse. The Computer Center, Communications, and other critical functions would be destroyed. Critical infrastructure that would be destroyed includes the mechanical/electrical room.



**Figure 10. Truck Bomb Blast Effects (Loading Dock)**

## BUILDING DATA

The HIC Headquarters building was built in the 1980s using conventional construction techniques. The building has a 22,000-square foot main floor for offices and computers, and a 3,300-square foot executive mezzanine (a second floor over the front part of the office).

Occupancy	B, S-1
Construction Type	2C
No. of Floors	1 floor and mezzanine, high bay in rear
High Rise Code	No
Fire Suppression	Fully sprinklered, wet pipe
Floor Area	
First Floor	19,157 SF
Mezzanine	3,380 SF
Total	22,537 SF
Number of Exits	6
Exits from Mezzanine	3
Occupancy Load	
First Floor	102 occupants
Mezzanine	31 occupants

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Area Separation	No
Fire Alarm System	No
Monitored Sprinkler	Yes
Fence	4 feet high, rear only, to keep people from falling into a valley

**Applicable Codes**

Building	1996 BOCA National Building Code w/ 2000 VUSBC amendments
Electric	1996 VUSBC, 1996 NEC
Plumbing	1995 IPC w/1996 supplement
Mechanical	1996 International Mechanical Code
Fire	1996 BOCA National Fire Prevention Code
Accessible	1996 BOCA, 1992 CABO/ANSI 117.1

BOCA - Building Officials and Code Administrators International, Inc

USBC – Uniform Statewide Building Code

NEC – National Electric Code

IPC - International Plumbing

CABO/ANSI 117.1 – Uniform Federal Accessibility Standards

**BUILDING STRUCTURE**

The walls are made of concrete masonry units (CMUs) with a brick veneer on the outside. Steel framework supports the structure, and exposed columns are enclosed in gypsum wallboard. The roof is a metal deck with gravel on top and insulation underneath. It is slightly angled to allow water to drain. The roof overhangs the front entrance by 8 feet. This provides a covered area for employees to stay dry on rainy days. Cylindrical columns support the overhang.

Windows are double glazed, ¼-inch thick annealed glass.

With a loading dock on the west side, it is possible for vehicles to park right next to the building. Normal parking for employees is in front; the closest row is 44 feet from the front door.

The company does not have a mailroom; incoming mail is normally processed by the receptionist just inside the front door. Large packages shipped to the company (computers, etc.) are delivered to the loading dock in the rear and handled by the Computer Center staff.

**MECHANICAL SYSTEMS**

Heating for the HIC building is provided by a combination of natural gas and electricity. This provides a regulated environment for the sensitive computer and communications equipment, and a comfortable environment for employees.

The main heater sends hot air into the heating, ventilation and air conditioning (HVAC) room, next to the mechanical and electrical (M&E) room. From here it is distributed throughout the building. Offices, restrooms and the employee's lounge are directly heated by this warm air. The



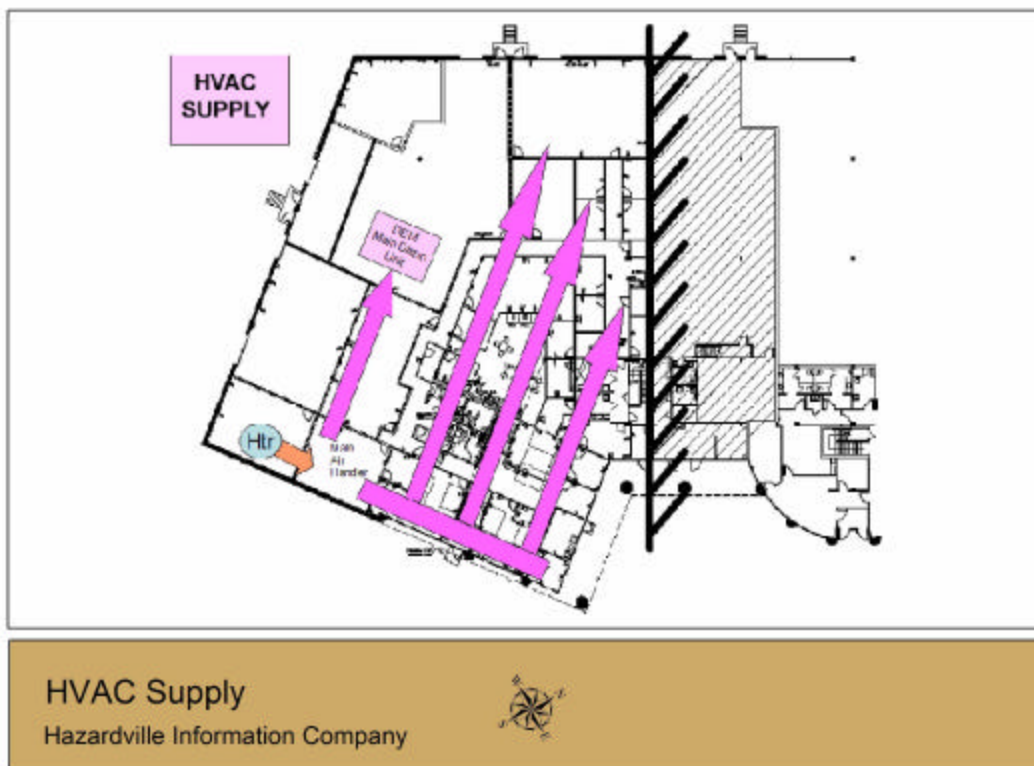
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Computer Center and the Communications Center use Digital Environmental Managers (DEMs) to direct the warm air where it is needed, add or remove humidity from the air, or even cool some areas while warming others.

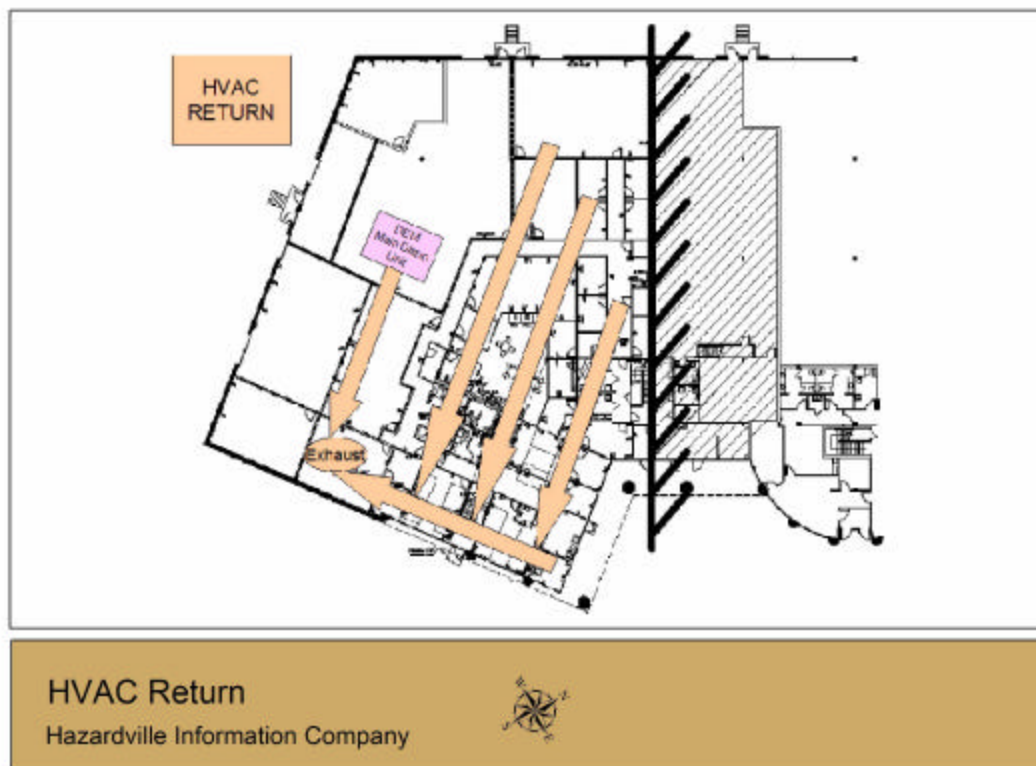
The air used to heat or cool the HIC Headquarters building is filtered in the HVAC room using standard industrial grade MERV 8 filters. Outside make-up air is brought in through a vent in the wall located approximately 10 feet above ground level. The vent is alarmed to prevent intruder access. A screened exhaust duct is on the roof. Airflow throughout the building is through a series of ducts hidden in the ceiling of each area. The ducts are divided in half to allow them to serve as supply and return headers. The divider is insulated to minimize heat transfer from one side to the other.

The Computer Data Center has two additional air cooling units located in the data center and uses the main chill water supply. The Data Center maintains a slight net positive pressure compared to the main office areas.



**Figure 11. HVAC Supply**

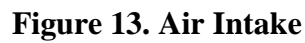
The return air for the main office space has sufficient room inside the ductwork and mechanical room area to incorporate additional filters and equipment.



**Figure 12. HVAC Return**

Cooling (or heat removal) is done by two chillers in the M&E room. Three Trane 100-ton chillers are available; normally only two are needed to cover all heat loads. The chillers remove heat from the chilled water system, and use the condenser water system to send the waste heat to two rooftop cooling towers. The chilled water is then routed from the chillers to air handlers for the majority of the building; cooling for the Computer Center and the Communications Center is done by directing chilled water to the DEMs. Chiller operation along with chilled water and condenser water flow are managed from a single control unit in the M&E room. A single chilled water pump provides adequate flow for all cooling situations; a backup pump is available at the push of a button. The same is true for the condenser water pumps.

The air intake is exposed and of typical louver construction.



The DEMs in the Computer Center and the Communications Center use airflow to transfer heat from electronic equipment to the chilled water, and return cool air to the equipment. Humidity is raised or lowered as necessary for each area of the room. The DEMs operate without the need for frequent monitoring by technicians; parameters and flowrates are controlled from a central station based on the needs of individual pieces of equipment.

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Natural gas enters the building through two meters under the loading dock staircase and goes through the overhead to the M&E room at the building's southwest corner. Branches split off for two gas powered space heaters in the high-bay area by the loading dock. The main gas line goes to the main heater in the M&E room.



**Figure 15. Loading Dock Area**



**Figure 16. Gas Meters Under Stairs**

The chillers, pumps, cooling towers, fans, etc., are all powered from the Support Bus (SB). The DEMs and all of the building thermostats receive power from the Computer Center Bus (CCB).

### Fire Protection and Life Safety

A key concern for HIC is fire. The building has been designed to meet the latest National Fire Prevention and Life Safety Codes. Sprinklers are located throughout the building, along with hand-held portable fire extinguishers. There are six exits that can be used for evacuation.

The fire protection and life safety systems consist of a “wet-pipe” single stage sprinkler system throughout the building, ceiling mounted automatic fire and smoke detectors connected to the central business park fire enunciator panel located in the next building and HVAC fire and smoke dampers in the M&E room air handling unit (AHU). There are no manual fire pulls, and the sprinkler system header is continuously pressurized, with water being held back by the temperature actuated valve on the sprinkler head. Each sprinkler head is individually activated by heat; any valve reaching 130° F would open. This system would allow a kitchen or office space fire to be extinguished, without unnecessarily dousing critical computer equipment with water. However, the sprinkler heads are exposed in the overhead of each room, and can be accidentally activated if bumped by a ladder, pole, etc. None of the ingress or egress doors have the new generation illuminating markings, only the standard door or ceiling mounted exit signs and emergency lighting. Should a fire occur, other than the fire detector flashing lights, there is not a mass notification system.





**Figure 17. Sprinkler Head**

There are 20 hand-held dry chemical fire extinguishers located throughout the building, 5 on the mezzanine level, and 15 on the first floor. Filled with monoammonium phosphate under approximately 200-250 pounds pressure, these extinguishers are designed to combat Class A, B and C fires. The fire extinguishers are visually inspected to make sure pressure is in the allowable band on a monthly basis by a local company.

The Computer Center and the Communications Center are equipped like the rest of the building. HIC has a long-term plan to install a clean agent extinguishing system in the electronic spaces, but construction has not started.

The Security Officer maintains the fire evacuation and response plan, has posted fire evacuation routes in key office hallways and break areas, and has a key to the building that has the main fire panel. The main fire panel is located in the lobby area, which is open to unrestricted access during normal business hours. In the event of a fire, the panel alerts the local fire department and the security company.

### **ELECTRICAL SYSTEMS**

Main power for the HIC office is provided by Hazardville Electric Power Company through two transformers outside the building. Two sets of buried transmission lines deliver 12,470 volt (12.47KV) power to the building from a nearby substation.

The two 12.47KV feeders lead to two separate transformers outside the building, one near the north side, and the other near the south side. The two “mini-mite” pad-mounted transformers are rated at 2500KVA, and they reduce the 12.47KV power to 480/277 volts for distribution around the building.



**Figure 18. One of Two Transformers**

Both transformers are continuously on line, and feed separate loads. Neither is loaded above 50 percent, and a tie breaker allows either transformer to support all building loads, except during the peak cooling months when three chillers are operating.

Backup power for HIC is provided by a single diesel generator, located in a shed in the rear parking lot. Specs for this Detroit Diesel Model 1250DS-4 Spectrum unit follow:

Model 12V4000 Engine	Model 7M4052 Generator
4-Cycle	Voltage 480/277 VAC
Turbocharged, Intercooled	3 Phase/60 Hz
V-12 Cylinder Configuration	1250KW/1563KVA
2975 Cubic Inch Displacement	1879 Amps
1800 RPM	Sustained Short Circuit Current up to
Max Power 1380 KW/1850 BHP	300 Percent of Rated for 10 Seconds
Exhaust Temperature 402° C/755° F	Brushless, Rotating-Field
Water Cooled, Electric Start	Pilot Excited
319 GPH Fuel Flow at 100 Percent Load	
240 GPH Fuel Flow at 75 Percent Load	1 Year Limited Warranty
165 GPH Fuel Flow at 50 Percent Load	

The backup generator is equipped with a 50-gallon day tank, normally kept at least 80 percent full. The day tank draws fuel from a 2,000-gallon main fuel tank, buried under the parking lot near the diesel generator shed. A small electric pump is used to fill the day tank when necessary.

The day tank's level is measured using a sightglass. The level of the main fuel tank is measured with a probe each quarter by a visiting Detroit Diesel representative, who also starts the engine to run unloaded for about 20 minutes. Fuel is delivered by a local contractor, who normally responds the day after being called.

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The diesel generator is configured to automatically start upon loss of commercial power to the CCB. This happens about twice a year due to electrical storms or utility maintenance in the neighborhood. An automatic bus transfer switch aligns the generator to the CCB as soon as the generator is ready to support the bus loads. This normally takes less than 5 seconds. In addition, a manually operated tie breaker is available to supply backup power to the SB via the CCB; however, the SB cannot receive backup power by itself. The backup diesel generator has never had to support HIC's power demands for longer than about 2 hours, and never with more than one chiller operating. It has never been tested for an extended period under heavy load.

An uninterruptible power supply (UPS) is located inside the building's "high-bay" area. Rated at 1000KVA, it is designed to support all loads on the CCB for up to 60 minutes. The diesel generator has never taken more than 30 seconds to start and assume the bus loads. If the diesel generator did not start on a loss of commercial power, 60 minutes would be ample time for HIC personnel to conduct an orderly shutdown of Computer Center equipment.

The batteries to support the UPS are in a small room next to the UPS room. The only instrumentation in the room is a thermometer. The 50 lead-acid batteries are inspected semi-annually by the manufacturer's representative. A capacity test discharge was conducted when the batteries were installed 2 years ago. The 60-minute endurance was calculated from that test.

HIC's electrical loads are divided between two main electrical buses, the CCB and the SB. They are located in separate "closets" of the building. A tie breaker allows the buses to be connected, so they can be powered by a single main transformer, or to allow SB loads to be carried by the backup diesel generator. The system is monitored by a digital energy management system, which provides indications, alarms, and instructions.

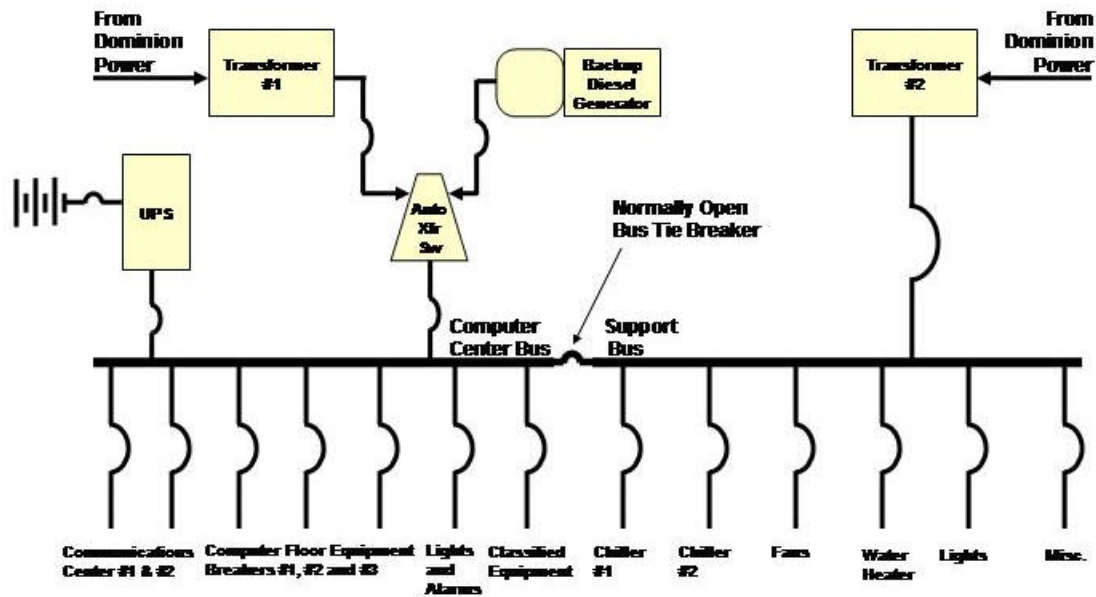
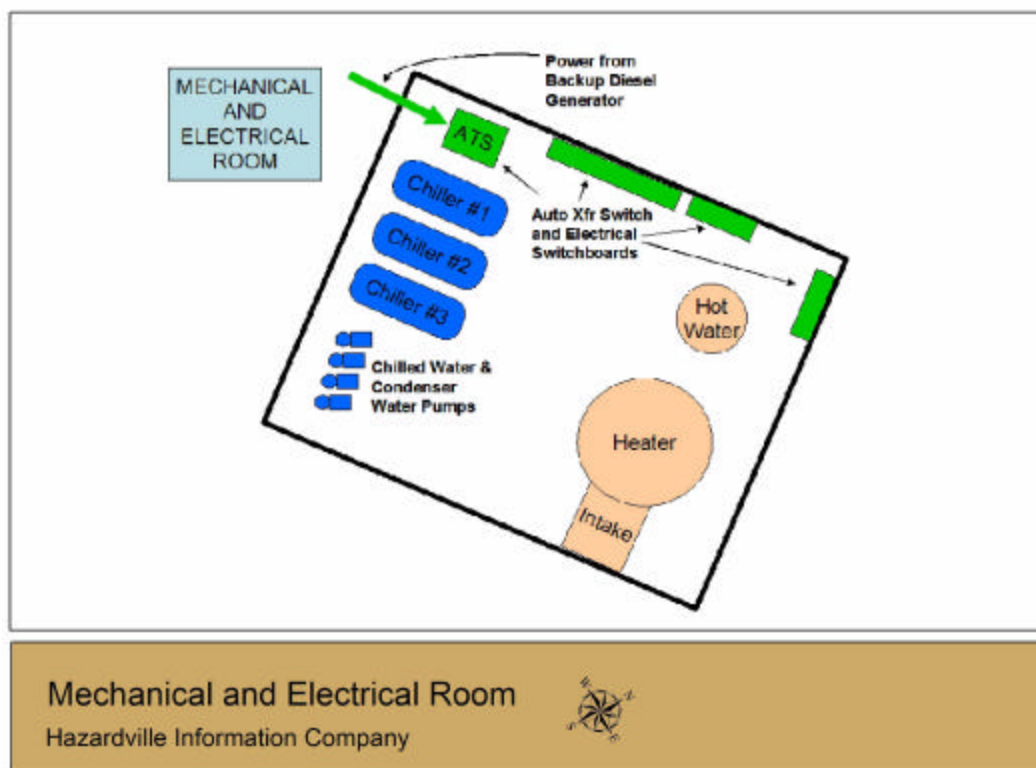


Figure 19. Electrical “One-Line” Diagram

Typical of many commercial office buildings, the mechanical and electrical systems share common utility penetrations and floor space. There are no redundant utility feeds to the building from different directions.





**Figure 20. Mechanical and Electrical Room**

## INFORMATION OPERATIONS

The Computer Center is the heart of HIC's operations. The rest of HIC exists to support the Computer Center.

### Hardware

The Computer Center is composed of several interconnected systems and one independent system for classified data processing. The systems run VMS, Unix, or Windows. Although the equipment list changes almost monthly as systems are upgraded and new clients' needs are being met, as of April 2003, the computers included the following:

- One 4-processor Silicon Graphics Power Challenge
- Three dual-processor Silicon Graphics Origin 200 servers
- One dual-processor Silicon Graphics Octane
- Five Microway Dec Alpha 500 MHz systems (four Unix, one VMS)
- Three DEC Alpha 600 5/266 systems
- Two IBM RISC 6000/560 systems with 160 and 128 Megabytes (MB) of memory
- One Stardent 3000 with 128 MB of memory, triple scalar & vector processors

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- One DEC Alpha-based (RISC) Model 3000/400 VMS workstation
- One DEC Vaxstation 4000/90 system with 128 MB of memory
- Sixteen Windows based workstations



**Figure 21. Computer Center**

All computers have access to large-capacity disk storage units, with shared mounting of major disk units throughout the complex. The VMS systems are configured as a Vax cluster; the Unix systems have common user accounts and files. The major systems are reachable from throughout the center and also through an Ethernet. The networks interface to the company-wide network and through it to the Internet.

Because some customers rely on HIC to support their data storage needs, the Computer Center also contains a massive data storage “jukebox.” A StoreAll Model 5500 provides fully automated storage, using robot arms to provide rapid retrieval. Its capabilities include:

- 3.0 Terabyte Total Capacity
- 2.5 Megabyte Per Second (MBps) Transfer Rate
- 500 CD Per Hour Change Rate
- 10,000 CD Storage Rack

Client data is backed up as requested by the clients, as frequently as once per day. The Back-O-Matic digital backup system manages the backup process, selecting which data are backed up on which day. All backups are done to CD; these are stored in the StoreAll Model 5500. HIC maintains an off-site storage location for clients that require backup data to be stored at a separate site. Classified backup data for certain government clients are stored in a special fireproof safe in the Secure Space.

Backup procedures for HIC’s computer operating systems, digital telephones and other company systems are similar as for their clients. Most of HIC’s computer systems can be used to backup another system. For those systems without in-house backups, replacement sources are identified. In most cases, replacement hardware can be delivered and setup within 2 days.

## COMMUNICATIONS

### Data

HIC has two T1 lines and one T3 line connected at the demark to ATT's high performance backbone network. The ATT fiber connectivity provides more than enough bandwidth for HIC's current needs and planned future expansion.

### Telecom and Network Connections

- Two T1 lines (1.544 MBps)
- One T3 (45 MBps)
- Frame Relay
- Narrowband ISDN (64/128 KBps)



**Figure 22. Telecom and Network Connections**



**Figure 23. Telecom and Network Connections**

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The Cisco powered network features multiple 7500 VXR+ routers. Border Gateway Protocol (BGP) reroutes traffic between the routers and to the Internet. A variety of switches in the Communications Center and at client sites are used to ensure connectivity. Some clients use Hot Standby Routing Protocol (HSRP), which provides additional redundancy.

A variety of firewalls and other security systems are in place to protect the company and its clients. The firewall solution is based on the Cisco PIX to provide highly resilient firewall protection. Other security systems include reporting and analysis tools and network detection devices, which help protect the company's computers from hacking.

Communications to support HIC's classified government clients cannot be discussed in detail. Nevertheless, they used leased lines for point-to-point connectivity, and they are robust, with diversity and redundancy built in.

### Voice

Although HIC does not provide voice communications services to customers, the need to communicate with them quickly and reliably is important. Therefore, the company has invested in NEC DS2000 telephone systems, which come with 8-slot cabinets that can handle 32 lines from 48 stations. The system's digital processor provides reliability, speed, and features to keep HIC staff members in touch with their customers.

### PHYSICAL SECURITY

Much of the company's guidance for security comes from the National Industrial Security Program Operating Manual (NISPOM), the government's guide to protecting contractor facilities. The NISPOM is promulgated by the Defense Security Service (DSS) and is available on the World Wide Web at: [http://www.dss.mil/isec/nispom\\_0195.htm](http://www.dss.mil/isec/nispom_0195.htm).

HIC's Security Officer uses a layered approach to physical security. The outermost physical security layer is provided by a contract security firm and the Defense Protective Service (DPS).

The contract security firm periodically patrols the parking lots in marked vehicles. The security officers are not armed, but they carry cellular phones to contact the local police. These officers do not have security clearances, and are not allowed to enter the HIC Headquarters if no employees are present.

The DPS officers patrol the entire National Capital Region (NCR) and are tasked to respond to emergencies at Defense Department or contractor facilities. DPS officers are armed and have law enforcement authority. They are allowed to enter the HIC building, but normally do not as part of their rounds.

The parking lot behind the HIC office is well lit and monitored by older generation analog CCTV cameras using telephone wires that are connected to video displays in the HIC Security Officer's office and recorded on standard VHS tape. The CCTVs are commercial grade black



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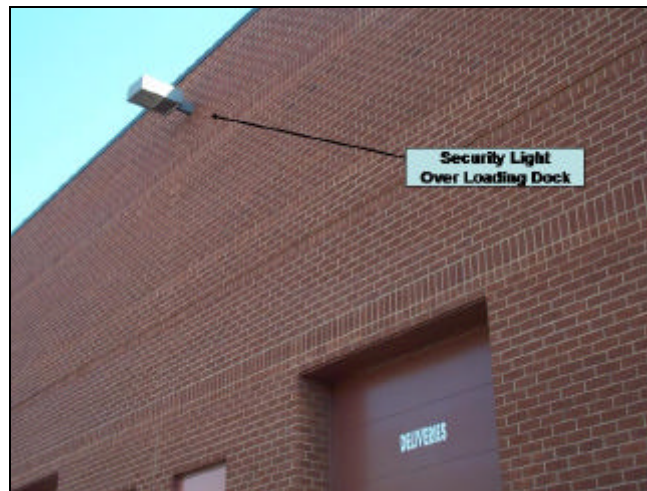
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and white with a 180-degree field of view that the security officer can control via the display panel. The front parking lot is lit, but not monitored.

HIC's middle layer of security is the building envelope. The building is monitored by door and window alarms, which connect to ADT, the nationwide alarm company. Unauthorized opening of any door or window will immediately notify ADT via telephone. ADT will normally call the HIC Security Office prior to contacting the police and DPS. HIC employees have proximity cards to allow them to enter the front and loading dock doors without activating the alarm.



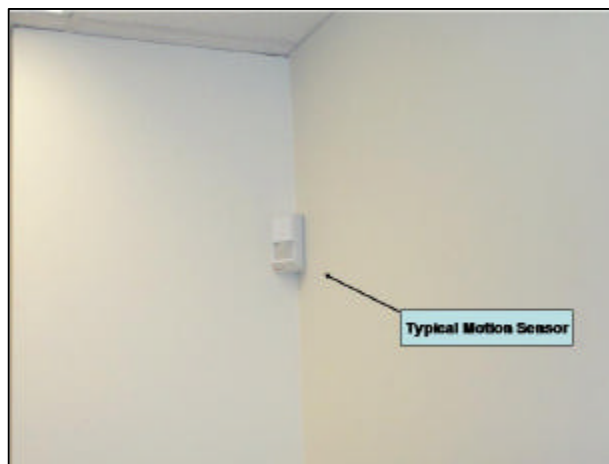
**Figure 24. Proximity Cards Readers and Alarms**



**Figure 25. Security Lighting**



**Figure 26. Electronic Badge Reader**



**Figure 27. Motion Detector**

The innermost layer of physical security involves the Computer Center and the Communications Center. Equipped with locked doors, these two rooms meet the government's requirements for handling classified material. Only authorized employees possess the necessary proximity cards and PINs to gain access. Unauthorized access to either space will sound sirens, flash lights, and notify the HIC Security Officer and DPS. The access doors are not manned or monitored with cameras. The crawl spaces created by the raised floor in the Computer Center are barricaded by a wire fence in the three locations where it can be accessed from other parts of the building.

## EMERGENCY RESPONSE

In the event of an emergency, HIC senior management use the large conference room as an Emergency Operations Center. The room is equipped with network and telephone connections and cell phones are able to receive a signal.



**Figure 28. Large Conference Room, Emergency Operations**

The nearest fire station is approximately 2½ miles north of the HIC Headquarters. Seven other fire stations are within 5 miles of the site. Firefighters are trained as Emergency Medical Technicians (EMTs) and Hazardous Material Technicians. Many are also skilled in technical rescue (high places, confined spaces, etc.). Ambulances are also dispatched from these stations. Emergency response time for emergencies is estimated to be 8-10 minutes. Fire hydrants are available in the office park.

The nearest hospital with an emergency room is 5 miles away. Other emergency response information includes:

- Exit signs: Located above each exit.
- Battery operated emergency lights: Strategically placed throughout the building.
- Emergency exits: Normally closed and locked doors have “panic bars” for use in emergencies.
- Announcing system: The telephone system has a building-wide announcing feature that can be activated by pressing one button at any phone.
- Evacuation plan and escape ladders for the mezzanine: None.
- Emergency stairway: Located far from main stairs.

## NATURAL AND TECHNOLOGICAL HAZARDS

### Natural Disasters Hazards

The county's Local Emergency Planning Committee provided the following information regarding natural disasters:

- The state experiences an average of 7 tornadoes/hurricanes per year.
- The area's earthquake risk is 1 (Scale 0-4).
- The state experiences 80-100 days per year with one or more lightning strikes.

### Technological Disasters Hazards

HIC is surrounded by a number of commercial activities and key national critical infrastructure to include HAZMAT facilities, HAZMAT being transported on the roads and rails, a nearby fuel tank farm, and an airport.

#### Hazardous Material (HAZMAT) Facilities

There are two large manufacturing plants with large quantities of hazardous materials stored on site within 2 miles of the HIC Headquarters, one to the north and the other to the southwest. In addition, there are more than a dozen Tier II HAZMAT Facilities within 3 miles of the building (in all directions).

The prevailing weather pattern for the area in the summer and fall is from the south Atlantic and the Gulf of Mexico. Warm, moist air brings thunderstorms and higher humidity. In the fall, cooler air from the north and west returns. Winter weather blasts across the state from the northern or central part of the continent. With no other weather activity, the prevailing wind is normally from the south in the Summer and from the north-northwest in the Winter.

None of the nearby facilities were contacted during this analysis. There is no information available regarding accidents or incidents involving these facilities.

#### Highway Movement of Hazardous Material (HAZMAT)

A major interstate highway is located within ¼ mile of the HIC Headquarters. Approximately 5,000 trucks per day pass the HIC office on the nearby interstate highway. About 30 percent of these trucks (1,500 trucks/day) carry placards indicating that HAZMAT is aboard, but only about 5 percent (250 trucks/day) carry sufficient HAZMAT to warrant placarding.

Approximately 50 percent of the HAZMAT passing the HIC office is Class 3 (flammable and combustible liquids). Class 2 (gases) and Class 8 (corrosives) each constitute about 15 percent. Approximately 10 percent of the trucks carry more than one class of HAZMAT.





**Figure 29. HAZMAT Truck on Interstate Highway**

The State Police Department inspects 5-10 percent of the HAZMAT carrying trucks on interstate highways.

Approximately 476 incidents involving the transportation of HAZMAT occur each year in the county in which HIC is located. Most of these involve flammable gas and liquids. Only one HAZMAT incident took place on a highway within 2 miles of HIC in the period 1995 to 2002.

#### Rail Movement of Hazardous Material

CSX Transportation and Norfolk-Southern Railway maintain a transportation corridor approximately ½ mile from HIC. There appear to be no restrictions on the material carried along these rail lines. Neither company was available for interviews.

Nevertheless, rail traffic has been informally monitored in this area. It is estimated that approximately 10,000 railcars of HAZMAT move through this area each year. Hazardous materials range from liquid petroleum products to chlorine to anhydrous ammonia.

There are no recent records of any HAZMAT spills or incidents involving rail transportation in the county in which HIC is located.

#### Liquid Fuels

A leg of the Piedmont Petroleum Pipeline (PPP) runs underneath the office park in the vicinity of HIC Headquarters. Part of Piedmont's regional network, this portion of the pipeline normally carries a variety of refined products, including commercial and military jet fuels, diesel and three grades of gasoline, home heating fuels, etc. Four buried pipes carry approximately 20 million gallons per day.

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There is no available information regarding any pipeline ruptures or incidents in the vicinity of HIC.

Connected to the pipeline, less than 1 mile from HIC, is a 20-million gallon capacity fuel farm. Operated by the Shellexxico Company, this tank farm stores a variety of petroleum products, primarily gasoline. Although representatives of Shellexxico were unavailable for an interview, their operations appear to conform to industry standards. Thirteen tank trucks were observed leaving the tank farm in a 1- hour period, indicating a calculated movement rate of approximately 300 trucks per day (about 3 million gallons of fuel).



**Figure 30. Shellexxico Tank Farm**

Based on terrain elevation data, the ground level of the tank farm is 6 feet higher than the ground level at HIC. Only some of the fuel tanks are bermed, but leaking fuel is not likely to reach HIC's office park; the interstate highway between the two is 10 feet lower than the tank farm.

Air Traffic

Two airports are in the vicinity of HIC. One is a major international airport approximately 8 miles away. The other is a small, but busy general aviation airport less than 2 miles away. The office park in which HIC is located is in direct line with one of the approach and departure paths of this regional airport.

The website for the regional airport indicates it is capable of handling business jets, providing jet fuel and high octane aviation gasoline and other services.

The airport is tower controlled and handles approximately 100,000 flights per year.

## THREAT ANALYSIS

The following information was obtained from the regional office of the FBI and the State Police:

### Terrorist Threat

Since September 11, 2001, the terrorist threat in the area has been Yellow or Orange. Yellow has been the norm, except for the anniversary of the 9/11 attacks and during the recent war in Iraq.

Yellow Definition: Elevated risk of terrorist attack, but a specific region of the United States or target has not been identified

Orange Definition: Credible intelligence indicates that there is a high risk of a local terrorist attack, but a specific target has not been identified.

The elevated and high threat condition is not due to any specific information or threat to the area in which the HIC office is located, but rather due to the proximity to the metropolitan area, nearby military installations, etc.

There is no known threat to HIC Incorporated, any of its officers or employees. There are no known threats to any of the companies within the office park. Nearby commercial entities that are likely terrorist targets include the Shellexico tank farm, two rail lines, the busy interstate highway, and the transformer substation.

Although HIC is probably not a primary target, there is a military installation within 10 miles, two large prime contractors and one federal agency office in the business park, and potential collateral damage or targeting of HIC as an alternate if those organizations are targeted and attacked.

### Intelligence Threat

The HIC Security Officer maintains close coordination with government security officers and law enforcement agents as part of his normal duties. All HIC employees hold security clearances, Secret or higher. This makes them targets for foreign intelligence services. Although there has been no known case of an HIC employee being approached by a foreign intelligence agent, this is certainly a possibility. The company follows counterintelligence guidance and procedures from the Defense Security Service (DSS) and the Defense Intelligence Agency (DIA) regarding:

- Risk management of classified programs in industry
- Threat awareness
- Deterrence of illegal technology transfers
- Facilitating the prevention of economic espionage in defense contractor facilities

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**Criminal Threat**

Gangs and Drugs

There are several gangs operating in the metropolitan area and they have been responsible for a number of gang related murders. Drug activity continues to be a problem in the metropolitan area, but less so in the suburbs. There has not been any gang or drug activity near the HIC building.

Violent Crime

The 2002 Crime Index, which is composed of murder, forcible rape, robbery, aggravated assault, burglary, larceny-theft, and motor vehicle theft, was relatively unchanged from 2001 figures. In 2002, a woman waiting at a bus stop near HIC's office complex was assaulted; there have been no other reported crimes in the "neighborhood."

**Year 2000 Area Crime Comparison (Rates per 100,000 population)**

<u>Crime</u>	<u>County</u>	<u>State</u>	<u>United States</u>
Murder	1.30	5.7	5.5
Rape	10.74	22.8	32.0
Robbery	41.32	88.9	144.9
Aggravated Assault	40.02	164.3	323.6
Burglary	155.95	429.9	728.4
Larceny	1950.84	2064.8	2457.3
Vehicle Theft	197.27	251.6	414.2

Other Crimes: Employee Fraud and Identity Theft have become a growing problem in the state in which HIC is located. County crime statistics indicate these problems are prevalent nearby, and a nearby business lost \$11,000 to "trusted employees" in 2001, but there have been no indications of such problems at HIC.

**DESIGN BASIS THREAT**

The senior management of HIC reviewed the site, building, and threat information collected, and determined the Design Basis Threat to be:



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**Explosive Blast:** Car Bomb - approximately 250 lb. TNT equivalent. Truck Bomb - approximately 5,000 lb. TNT equivalent (Murrah Federal Building class weapon)

**Chemical:** Large quantity gasoline spill and toxic plume from the adjacent tank farm, small quantity (tanker truck and rail car size) spills of HAZMAT materials (chlorine).

**Biological:** Anthrax delivered by mail or in packages, smallpox distributed by spray mechanism mounted on truck or aircraft around metropolitan area.

**Radiological:** Small “dirty” bomb detonation within the 10-mile radius of the HIC building.

**Criminal Activity/Armed Attack:** High powered rifle or handgun exterior shooting (sniper attack or direct assault on key staff, damage to infrastructure [i.e., transformers, chillers, etc.]).

**Cyber Attack:** Focus on IT and building systems infrastructure (SCADA, alarms, etc.) accessible via internet access. Computer Data Center and Communications Center supporting infrastructure (e.g., firewalls, routers, main distribution rooms, backup tapes storage, etc.) location, redundancy, and power supply meet NIST and industry standards for physical access and protection. The analysis is not to include information assurance assessment activities (e.g., password, network monitoring, host and intrusion detection, etc.).

## LEVEL OF PROTECTION

Based on the Design Basis Threat and after reviewing the General Services Administration (GSA) and Department of Defense (DoD) standards, senior management selected preliminary Levels of Protection most applicable to HIC, with the guidance that adoption of any recommendations would be to the most stringent standard and would be in compliance with life safety codes. After the vulnerability and risk assessments were complete and mitigation options developed, final selection of mitigation options would be made by senior management and determined on a benefit-cost and risk reduction basis. The Levels of Protection to be used as the basis for the vulnerability and risk assessments are:

### GSA Level II

A Level II facility has between 11 and 150 employees and from 2,500 to 80,000 square feet.

#### 1. Perimeter Security

- a. Security control for parking (surface lots, adjacent structures, underground garages under the Lessor's control) is solely limited to the assignment (marked "reserved") of authorized Government parking spaces and vehicles.
- b. Adequate lighting, with emergency power backup, for the exterior of the building is required. Parking areas shall also be adequately lighted.

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c. 24-hour CCTV surveillance cameras with time-lapse video recording **may** be required as deemed necessary by a Security Specialist.

d. Application of shatter-resistant material shall be applied on exterior windows.

2. Entry Security

a. Security Guards **may** be required, as deemed necessary by a Security Specialist.

b. Intrusion Detection System (IDS) with central monitoring capability **may** be required, as deemed necessary by a Security Specialist, for the building exterior.

c. Peepholes in exterior doors **may** be required, as deemed necessary by a Security Specialist, when an IDS is not appropriate.

d. An intercom system, used in conjunction with a peephole, **may** be required as deemed necessary by a Security Specialist.

e. Entry control with CCTV and door strikes **may** be required to allow employees to view and communicate remotely with visitors before allowing access, as deemed necessary by a Security Specialist.

f. Exterior entrances shall have high security locks.

3. Interior Security

a. A visitor control/screening system is not required for these levels.

b. Utility areas shall be secured and only authorized personnel shall have access.

c. Emergency power sources to critical systems (i.e., alarm systems, radio communications, computer facilities, CCTV monitoring, fire detection, entry control devices, etc.) are required.

d. The following requirements pertain to the added protection of the building environment from airborne chemical, biological, or radiological attacks.

(1) Access to mechanical areas and building roofs shall be strictly controlled.

(2) Access to building information, including mechanical, electrical, vertical transport, fire and life safety, security system plans and schematics, computer automation systems, and emergency operations procedures shall be required. Such information shall be released to

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authorized personnel only. Names and locations of Government tenants shall not be disclosed within any publicly accessed document or record.

(3) Procedures (should airborne hazards be suspected or found) are required for the notification of the lessor's building manager, building security guard desk, local emergency personnel, or other Government emergency personnel, for the possible shutdown of air handling units serving any possibly affected areas.

4. Administrative Procedures

a. Building managers and owners are required to cooperate with and participate in the development and implementation of Government Occupant Emergency Plans (OEPs).

b. Conduct background security checks and/or establish security control procedures for contract service personnel as deemed necessary.

c. The Government reserves the right, at its own expense and manpower, to temporarily upgrade security during heightened security conditions due to emergency situations such as terrorist attacks, natural disaster and civil unrest. The measures shall be in accordance with the latest version of the Homeland Security Advisory System.

5. Blast/Setback Standards

a. The following blast/setback standards shall be met:

1. For Level II, a 20 foot setback<sup>1</sup> guideline with appropriate window glazing, as prescribed by WINGARD 3.15 or later or WINLAC 4.3 software, to achieve a glazing performance condition of 3b<sup>2</sup> and a façade protection level of "medium"<sup>3</sup> given a blast load standard of 4 psi/28 psi-msec is required.

<sup>1</sup> Setback refers to the distance from the face of the building's exterior to the protected/defended perimeter (i.e., any potential point of explosion). This would mean the distance from the building to the curb or other boundary protected by bollards, planters, or other street furniture. Such potential points of explosion may be, but not limited to, such areas that could be accessible by any motorized vehicle (i.e., street, alley, sidewalk, driveway, parking lot).

<sup>2</sup> Glazing Performance Condition 3b provides for a high protection level and a low hazard level. For a blast of 4psi/28psi-msec, the glazing cracks and fragments enter the space and land on the floor not further than 10 feet from the window.

<sup>3</sup> A "Medium Level Protection" to the facade will result in moderate, but repairable damage. The facility or protected space will sustain a significant degree of damage, but the structure should be reusable. Some casualties may occur and assets may be damaged. Building elements other than major structural members may require replacement.

## DoD Standards

HIC senior management evaluated the DoD standards and determined that they would attempt to meet the intent and objective of as many of the recommendations as possible. Of particular concern are blast, CBR, and associated operations/locations of functions and equipment such as mailrooms, dumpsters, loading docks, and emergency shut down.

The DoD level of protection selected is “low”, and the building category is “Inhabited Building”.

<b>UFC 4-010-01 APPENDIX B</b>	
<b>DoD MINIMUM ANTITERRORISM STANDARDS FOR NEW AND EXISTING BUILDINGS</b>	
Standard 1	Minimum Standoff Distances
Standard 2	Unobstructed Space
Standard 3	Drive-Up/Drop-Off Areas
Standard 4	Access Roads
Standard 5	Parking Beneath Buildings or on Rooftops
Standard 6	Progressive Collapse Avoidance
Standard 7	Structural Isolation
Standard 8	Building Overhangs
Standard 9	Exterior Masonry Walls
Standard 10	Windows and Glazed Doors
Standard 11	Building Entrance Layout
Standard 12	Exterior Doors
Standard 13	Mailrooms
Standard 14	Roof Access

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Standard 15	Overhead Mounted Architectural Features
Standard 16	Air Intakes
Standard 17	Mailroom Ventilation
Standard 18	Emergency Air Distribution Shutoff
Standard 19	Utility Distribution and Installation
Standard 20	Equipment Bracing
Standard 21	Under Building Access
Standard 22	Mass Notification
Recommendation 1	Vehicle Access Points
Recommendation 2	High-Speed Vehicle Approaches
Recommendation 3	Vantage Points
Recommendation 4	Drive-Up/Drop-Off
Recommendation 5	Building Location
Recommendation 6	Railroad Location
Recommendation 7	Access Control for Family Housing
Recommendation 8	Standoff for Family Housing
Recommendation 9	Minimize Secondary Debris
Recommendation 10	Structural Redundancy
Recommendation 11	Internal Circulation
Recommendation 12	Visitor Control
Recommendation 13	Asset Location
Recommendation 14	Room Layout
Recommendation 15	External Hallways
Recommendation 16	Windows



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<b>Level of Protection</b>	<b>Potential Structural Damage</b>	<b>Potential Door and Glazing Hazards</b>	<b>Potential Injury</b>
<b>Low</b>	Damaged – unrepairable. Major deformation of nonstructural elements and secondary structural members and minor deformation of primary structural members, but progressive collapse is unlikely.	Glazing will break, but fall within 1 meter of the wall or otherwise not present a significant fragment hazard. Doors may fail, but they will rebound out of their frames, presenting minimal hazards.	Majority of personnel suffer significant injuries. There may be a few (<10%) fatalities

<b>Location</b>	<b>Building Category</b>	<b>Standoff Distance or Separation Requirements</b>			
		Applicable Level of Protection	Conventional Construction Stand-off Distance	Effective Stand-off Distance	Applicable Explosives Weight
Controlled Perimeter or Parking and Roadways without a Controlled Perimeter	Inhabited Building	Very Low	25 M 82 ft	10 M 33 ft	Approx 250 lbs

## DoD Stand-off Distance

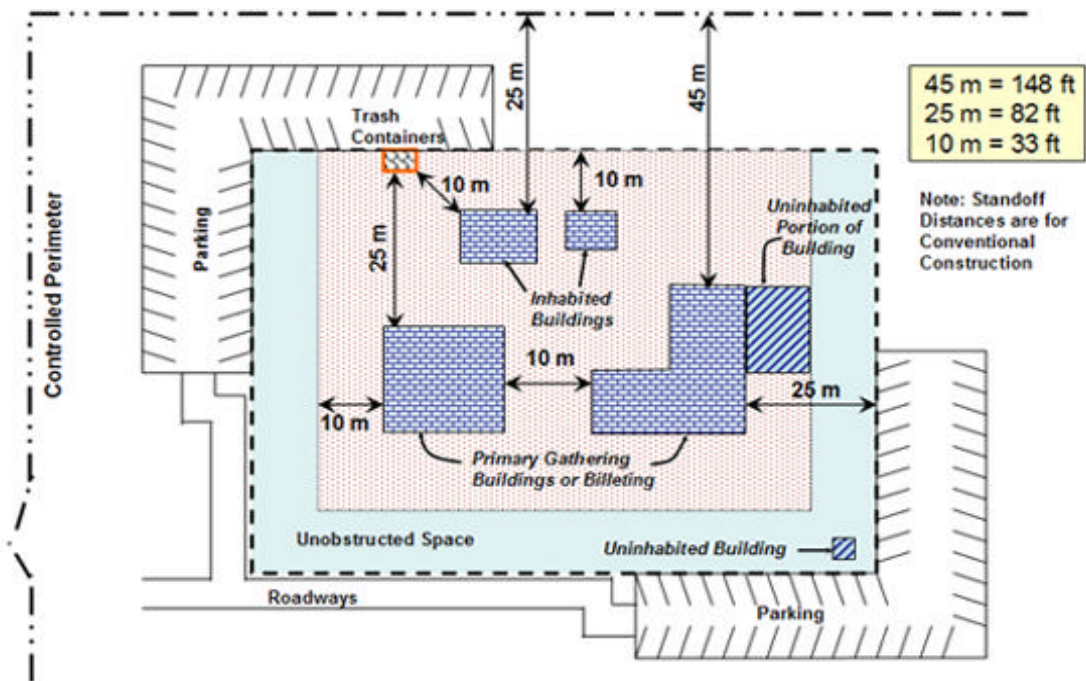


Figure 31. DoD Stand-off Distance